



Ministry of Health
Hashemite Kingdom
of Jordan

Standards of Care for Health Centers



Volume IV **Preventive Services**

September 2002



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Volume I
Health Center Management



Volume II
Clinical Case Management



Volume III
Reproductive Health



Volume IV
Preventive Services



Volume V
Nursing Care Services



Volume VI
Performance Checklists





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of Jordan

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PHCI
PRIMARY HEALTH CARE INITIATIVES



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Introduction

Health for all is an achievable goal for the citizens of the Hashemite Kingdom of Jordan where primary care focuses on providing high quality preventive, promotive, and curative care in a cost-effective manner. The Jordanian Ministry of Health and USAID-funded Primary Health Care Initiatives Project (PHCI) have formed a partnership to reach this goal.

The Standards of Care for Health Centers described here represent a milestone in the road towards better health. They are tangible evidence of the considerable thought and effort that has been devoted to promoting quality of care by the Ministry of Health.

The purpose of the “Standards” is to ensure that health center staff members have the basic and essential guidance required for safe, effective, and humane service delivery. The Standards are contained in five volumes, each addressing a distinct aspect of health center services. A sixth volume of performance checklists is included with the Standards to facilitate self-assessment and performance review. As a set, the Standards are intended to serve as a convenient reference, a guide for service delivery, and a tool to support performance improvement. When following the guidelines set forth in the Standards, members of health center staff are assured that services meet the accepted standard of care required by their communities. The volumes and contents are described below.

Volume 1: Health Center Management

The Management Standards are organized in four sections. The first section contains job descriptions for staff providing direct and supportive care at health centers. The descriptions are meant to serve as a job aid for those who hold the positions and their supervisors rather than a model for staffing. The second section conveys the expected values and norms for health center services through a description of patient and provider rights and responsibilities. The third section contains the MOH guidance for managing health center accounting procedures and records. The fourth section contains instructions for procurement of drugs, contraceptives, vaccines, and supplies for laboratory and dental services.

Volume 2: Case Management

The five clinical problems addressed in the Case Management guidelines are: diabetes mellitus type II, hypertension, acute respiratory infection, asthma, and diarrhea. These conditions represent a significant percentage of the common medical problems encountered at health centers. Detailed guidance for diagnosis and management of each clinical problem is given, including recommendations for drug management, health education, referral, and follow-up care. Algorithms accompanying each clinical problem inform critical diagnostic or management decision-making. Together, these tools provide reference options for both quick and comprehensive review. Performance checklists complete the package for facilitating self-assessment and peer review.

Volume 3: Reproductive Health

This volume contains guidance for the reproductive health care services typically performed by doctors, nurses, and midwives at primary health centers. Antenatal care focuses on initial assessment and continuing support for pregnant women. The postnatal care section guides follow-up care for new mothers and their infants. Family planning includes guidance for counseling and information on the full range of contraceptive methods available in Jordan. A brief section on HIV/AIDS provides general information, basic education, and prevention messages for the community. All procedures described in the volume are accompanied by performance checklists, which reinforce and highlight the essential skills required for high quality reproductive health services.

Volume 4: Preventive Services

This volume addresses two different but complementary aspects of prevention, which are of great importance to the communities served by health centers. The first section covers prevention of childhood diseases through immunization; the second addresses the prevention of infection transmission within the health facility and among clients, staff, and the communities they serve. Immunization guidelines describe management of the cold chain and vaccines, immunization procedures and schedules, roles of staff, recordkeeping, and supervision. Infection prevention includes guidelines for maintaining protective barriers through handwashing, use of gloves and antiseptics, and procedures for decontamination, cleaning, sterilization, and waste disposal. Performance checklists are provided for all important procedures as a guide for self-assessment and performance review.

Volume 5: Nursing Care

Nursing procedures influence the care of most patients who visit the clinic by supplying the medical information that forms the basis for higher-level medical decisions about care and follow-up. This volume gives special attention to the procedures that are commonly called nursing care, but which are frequently performed by other members of the health center team. Guidance for home visits, child growth and development, immunizations, general care, and first aid is presented. As in the other volumes, performance checklists are included.

Volume 6: Performance Checklists

The performance checklists presented in each of the five volumes have been compiled in this final volume. These compiled checklists are a convenient tool and job aid for refreshing knowledge, guiding self-assessment, and standardizing performance assessment at the health centers.

List of Acronyms

AIDS:	<i>Acquired Immunodeficiency Virus</i>
DPT:	<i>Diphtheria, Pertussis, and Tetanus Vaccine</i>
DT:	<i>Diphtheria-Tetanus Vaccine</i>
EPI:	<i>Expanded Program of Immunization</i>
FIFO:	<i>“First In, First Out”</i>
HB:	<i>Hepatitis B</i>
HBV:	<i>Hepatitis B Vaccine</i>
HIB:	<i>Haemophilus Influenza Type B</i>
HIV:	<i>Human Immunodeficiency Virus</i>
MMR:	<i>Measles, Mumps, and Rubella Vaccine</i>
MOH:	<i>Ministry of Health</i>
OPV:	<i>Oral Polio Vaccine</i>
TT:	<i>Tetanus Toxoid</i>

Immunization Practices

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Immunization Practices

Introduction

Immunization is one of the most powerful and cost-effective health interventions practiced today. If, at the appropriate stages in their lives, all women, children, and infants received potent vaccines, which have been correctly stored, vaccines would prevent a very high percentage of the estimated five million residual disabilities still caused annually by the diseases targeted by the Expanded Program of Immunization (EPI). Effective immunization programs have major additional advantages for advancing primary health care.

Immunization began in Jordan in the 1950s, as a containment measure, within the general services provided by the Public Health Division of the Ministry of Health (MOH). Since 1979, the National Immunization Program has been implemented as an essential and integrated element of primary health care. Surveillance data from health centers indicates a high coverage level of immunization against the diseases targeted by EPI. Moreover, child mortality from diseases targeted by EPI—tuberculosis, poliomyelitis, pertussis, diphtheria, tetanus, measles and hepatitis B—have decreased throughout the country over the last two decades.

To maintain high coverage and decreased incidence of diseases, and for continued improvement, the development of immunization standards such as these has become a necessity.

National Immunization Program Objectives

- Reduce morbidity and mortality from diseases targeted by EPI.
- Cover 95 % of children against diseases targeted by EPI.
- Work for the eradication of poliomyelitis, measles, and tetanus neonatorum.
- Make immunization procedures as perfect as possible.
- Make immunization accessible and acceptable to consumers.

Facility and Equipment Requirements

Space

- A room must be designated exclusively for immunization.
- Sick children are not permitted in this room.
- Appropriate health education materials should be available.
- Have anti-shock therapy available in the immunization room.

Equipment and Supplies

The following immunization equipment and supplies should be available in each health center:

- A functioning refrigerator dedicated to vaccines (two refrigerators are preferable): one for daily use and the other for storage).
- Electrical connections: use plug guards to prevent accidental dislodging of wall plugs.
- A thermometer, a freeze watch, and an ABC cold-chain monitor for each vaccine refrigerator.
- Special cold boxes in good working condition for vaccine transport (safety boxes).
- A cold chain monitor for every vaccine shipment.
- An adequate stock of disposable syringes.
- A special container for the disposal of used needles and syringes
- A separate container for disposal of used vials.
- Recording forms.

Records

- Daily, monthly, and annual vaccination records and appointment records.
- Vaccination cards, child health records, and health education pamphlets.
- Temperature charts (2): one chart attached to the outside of the refrigerator door, and one for the freezer.

Cold Chain Maintenance

Maintenance Procedures

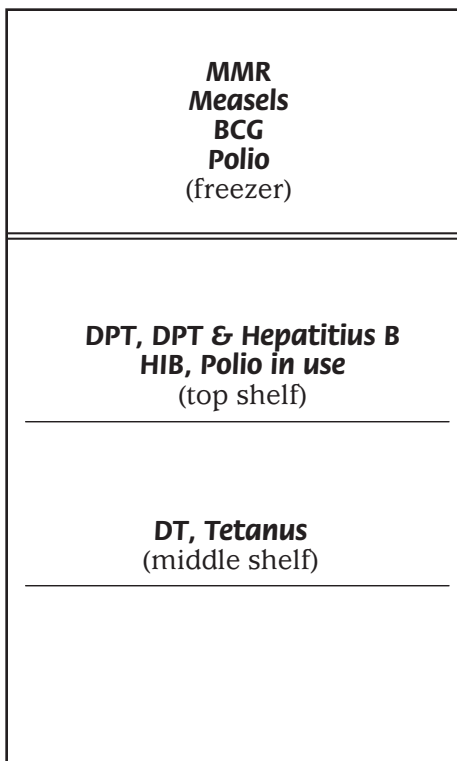
- Leave space between the refrigerator and the wall to allow aeration of the compressor.
- Check to ensure that the refrigerator's defroster is functioning.
- Do not expose the refrigerator to sunlight or air currents.
- Do not keep food, drinks, or drugs except vaccines in the refrigerator designated for vaccines.
- Store vaccines in the refrigerator in a manner that permits cold air to circulate.
- Arrange vaccines according to their expiration dates, so that older stock is used first. Follow the FIFO ("First In, First Out") rule.
- Do not keep vaccines in the refrigerator door.
- Complete a list of the refrigerator's contents with batch numbers and expiration dates and attach it to the outside of the refrigerator door.
- Place bottles with colored water on the lower shelf of the refrigerator door.

Vaccine Storage

- Keep DPT, hepatitis B, DPT and hepatitis B (quadrivalent vaccine), and the polio currently in use in the refrigerator on the upper shelf.
- Keep Tetanus and Diphtheria and Diphtheria/Typhoid on the middle shelf.
- Keep Measles, MMR, BCG (the freeze-dried form), and polio in the freezer. The diluted measles and BCG can be kept on the top shelf of the refrigerator for 6-8 hours.
- Keep other vaccines on the middle shelf.
- Keep the solvents cold and do not freeze.
- Keep DPT and hepatitis B, DT, tetanus, and vaccine vials away from direct contact with ice.
- Do not expose BCG and measles vaccines to direct sunlight.

Figure 1. Storage of Vaccines in a Refrigerator

IMPORTANT: Freezer Temperature: -15 to -25°C
Refrigerator Temperature: +2 to +8°C



Transportation of Vaccines

- Keep vaccines in cold boxes during transport to the health center.
- Do not expose vaccine cold boxes to direct sunlight during transport.
- Follow the shortest route to the health center, so that no time is wasted in transporting vaccines from the store to the health center.

Organization of Services

Workforce Standards

- Assign, at minimum, one well-trained nurse to work in the immunization room at all times.
- The nurse (and in some cases the health inspector) should be trained in:
 - *Implementing the cold chain for vaccines.*
 - *Transporting vaccines to health centers.*
 - *Analyzing immunization statistics.*
- A well-trained physician should supervise and support all of the above.
- Staff should receive ongoing education and training to maintain knowledge.

Planning and Coordination

- Determine the number of people from the target population who should be immunized.
- Provide immunization on a daily basis.
- Coordinate immunization appointments for the infants and children with their mothers' appointments, if possible.
- Devote one fixed day per week to reviewing immunization defaulters and arranging appropriate action for their follow-up.
- Home visits for other purposes should include immunization of difficult defaulters.

Vaccine Management

- Arrange and maintain vaccine supplies.
- Check transportation from the store to the health center, as well as preservation and maintenance of the cold chain.
- A sufficient stock (one-month) of valid vaccines.
- Keep vaccine vials in an icebox throughout the session.
- Keep and maintain a sufficient (one-month stock) of valid vaccines, and estimate the amount of vaccines required for the health center.

- Dispose of expired vaccines according to MOH guidelines.
- Put used vaccines in a special box so that the MOH can verify what happened to the vaccine bottles.
- Dispose of used syringes and needles in a “sharps” container and dispose of sharps containers correctly (usually burned) according to Infection Prevention Guidelines. Health center staff should obtain or make new containers.

Program Implementation Guidelines

Vaccines must be given according to the doses prescribed in “Table 1. Immunization Schedule & Routes of Administration” and these immunization guidelines.

Immunization Procedures

1. Before giving a vaccine, check for any contraindications in the infant or child, such as acute febrile disease or fever.
 - Inform the mother about any side effects and how to deal with them.
 - Have first aid treatment for shock available if it occurs.
 - Observe all children for 30 minutes after they are given a vaccination.
2. Administer immunizations according to MOH instructions and guidelines.
3. Check that you have the correct vaccine.
4. Remove vaccine vials from the refrigerator only when the first child arrives at the beginning of the session.
5. Check that the vaccine has not expired.
6. Vaccines that are given intra-muscularly to infants and young children should be injected in the antero-lateral aspects of the thigh.
7. Do not mix different vaccines in the same syringe.
8. When using alcohol to clean the site for injection, wait until it dries so as not inactivate the vaccine—in particular living vaccines like measles and MMR.
9. To prevent needlesticks, do not recap needles.
10. Recordkeeping
 - Keep accurate records.
 - Keep a record of the dosage given on each child’s card.
 - Fill in the vaccine card monitor.
 - Prepare immunization statistics and know how to calculate the coverage rate.

11. Patient Education

- Be aware of health education methods.
- Educate mothers about the importance of vaccination.
- Educate mothers on side effects like fever, irritability, and local tenderness associated with vaccines. Explain how to deal with side effects.

12. Follow-up

- Inform mothers about the importance of regular attendance at different immunization sessions.
- Write the date of the next visit for immunization on the vaccination card and inform mother of the date.

Supervision Procedures

Discuss and develop the objectives of vaccination coverage in the catchment area at the beginning of each year with the immunization nurse. Participate in educating all nurses about vaccines and supervise vaccine administration methods.

Specific supervision responsibilities include:

- Check the maintenance of the cold chain on a regular schedule.
- Check the expiration dates of the different vaccines.
- Check storage of the vaccine during immunization sessions.
- Regularly check on the correct disposal of the partly used vaccine vials and used syringes at the end of each session.
- Supervise the procedures for defaulter tracing and immunization.
- Supervise, investigate, and treat any adverse events that occur following immunization.
- Ensure that the nurse (or health inspector) knows the dose, site, schedule (age of child), side effects, etc., of each vaccine.
- Detect mistakes, give directions, and offer remedial advice.
- Reinforce the importance of recognizing contraindications and side effects of vaccinations.
- Prepare reports on the number of children vaccinated.

Program Assessment

MOH immunization program goals and reporting requirements are presented in this section to broaden awareness of national scope of the program and provide information about how the data collected from each health center will be used.

National

Data reported by health centers throughout the country are used in calculating immunization coverage and incidence of infectious diseases. National indicators for measuring immunization coverage include the following:

- Number of children who have completed their first year of age and were fully immunized against following diseases:
 - *Polio (four doses)*
 - *DPT (three doses)*
 - *Hepatitis B (three doses)*
 - *Measles (one dose)*
 - *HIB 3 and BCG (one dose)*
- Percentage of pregnant women vaccinated with two or more doses of tetanus toxoid (denominator = the number of pregnant women being seen by MOH).
- Number of children receiving first booster dose of DPT and Polio.
- Number of children receiving second booster dose of DT, and Polio.
- Number of children receiving MMR.
- Incidence rate during the past year of the target diseases among children below five years of age per 100,000 population:
 - *Hepatitis B*
 - *Poliomyelitis*
 - *Diphtheria*
 - *Tetanus*
 - *Whooping cough*
 - *Measles*
 - *Rubella*
 - *Mumps*

Data reported by health centers throughout the country are used in calculating immunization coverage and incidence of infectious diseases.

Governorates

Aggregate health center data to monitor the following indicators:

- Number of children fully immunized by age one year.
- Number of pregnant women vaccinated with two or more doses of TT.
- Drop-out rates of the different vaccine doses:
 - *BCG (1st dose)*
 - *DPT and Hepatitis B, and Polio (1st, 2nd, and 3rd dose)*
 - *Measles*
 - *MMR*
 - *HIB (1st, 2nd, and 3rd dose)*
- Drop-out rate of children who have not completed full series (i.e. all three doses of DPT and Hepatitis B, and Polio).
- Number of first booster dose of DPT and Polio.
- Number of second booster dose of Polio.
- Percentage of vaccines wasted; i.e., expired vaccines and unused doses in multiple dose vials (10-dose):

VACCINE	AMOUNT CONSUMED PER MONTH	ACTUAL DOSE GIVEN	% WASTED
DPT & Hepatitis B			
Poliomyelitis			
Measles			
BCG			
MMR			
HIB			

Health Centers

Record, report, and monitor the following data:

- Number of children who have completed their first year of age and are fully immunized.
- Number of women of childbearing age who were vaccinated against tetanus with two or more doses.
- Number of pregnant women who were vaccinated with two or more doses of TT.
- Number of child drop-outs for the following vaccines:
 - *DPT and Hepatitis B, Polio, (1st 2nd, and 3rd dose)*
 - *Polio (4th Dose)*
 - *Measles*
 - *MMR*
 - *HIB (1st, 2nd, and 3rd dose)*
- Number of the first booster dose: DPT and polio
- Number of the second booster dose: DT, measles, and polio.
- Rate of adverse events arising from vaccination.
- Vaccine wastage.

Table 1. Immunization Schedule & Routes of Administration*

Vaccine	1st Dose	2nd Dose	3rd Dose	4th Dose	1st Booster	2nd Booster	3rd Booster	Routes of Administration
Polio (OPV)	2 months	3 months	4 months	9 months	18-12 months	6 years		Two drops in the mouth
DPT & HB (Hepatitis B)	2 months	3 months	4 months					Deep IM injection – thigh
DPT					18-24 months			Deep IM injection – thigh
DT						6 years	15 years	Gluteus maximus
Measles				9 months				Deltoid
MMR					15 months			Subcutaneous – in the upper part of the arm
HIB Haemophilus Influenza B	2 months	3 months	4 months					Deep IM injection – thigh
BCG	5-30 days							Intradermal

*Adopted by the Hashemite Kingdom of Jordan/MOH in July 2001.

Immunization Practices Performance Checklists

Performance Checklist 1:
Immunization Program Management

Performance Checklist 2:
Conducting Immunization Sessions

Performance Checklist 3:
Cold Chain Procedures

Performance Checklist 1: Immunization Program Management

Instructions: Observe and question the nurse or the midwife who is responsible for the immunization program at the health center. For each of the tasks listed below, place a check in the “Yes” or “No” box, as appropriate, to indicate whether or not the task was achieved. If a particular task is not applicable, enter NA (“not applicable”) in the “Comments” column. Use the “Comments” column to note details about why a particular task was not achieved or other information that may be useful in identifying or resolving inappropriate practices.

Task	Achieved?		Comments
	Yes	No	
1. Is aware of the immunization program objectives.			
2. Has calculated the immunization target for the population served by the health center			
3. Knows contra-indications for administering each vaccine			
4. Knows the dosage, method of administration and schedule for each vaccine.			
5. Knows the concept and importance of the cold chain.			
6. Prepares records and reports of the immunization program activities: <ul style="list-style-type: none"> • Children vaccinated monthly • Year old children fully immunized • Child drop out rate per vaccine • Females receiving TT • Immunization coverage curve 			
7. Knows/Estimates the required amount of vaccines.			

Performance Checklist 2: Conducting Immunization Sessions

Instructions: Observe and question the nurse or the midwife who is responsible for the immunization program at the health center. Place a check in the “Yes” or “No” box, as appropriate, to indicate whether or not the task was achieved. If a particular task is not applicable, enter NA (“not applicable”) in the “Comments” column. Use the “Comments” column to note details about why a particular task was not achieved or other information that may be useful in identifying or resolving inappropriate practices.

Task	Achieved?		Comments
	Yes	No	
1. Vaccine vials are taken out of refrigerator only upon arrival of the first child for that immunization session.			
2. Vaccine vials are kept in the refrigerator throughout the session (during large-scale vaccinations, vials may be kept in a container with ice).			
3. Used vaccine vials are discarded in a special box for review by MOH.			
4. Used syringes and needles are properly discarded into a “sharps” container.			
5. Records are made on the child’s card, family record, and other related registers during the session.			
6. Children who have not completed their schedule of immunizations (drop-outs) are identified weekly.			
7. Vaccines are accurately given: note dose, site, and method of administration.			

Performance Checklist 3: Cold Chain Procedures

Instructions: Observe and question the nurse or midwife who is responsible for the immunization program at the health center. For each of the tasks listed below, place a check in the “Yes” or “No” box, as appropriate, to indicate whether or not the task was achieved. If a particular task is not applicable, enter NA (“not applicable”) in the “Comments” column. Use the “Comments” column to note details about why a particular task was not achieved or other information that may be useful in identifying or resolving inappropriate practices.

Task	Achieved?		Comments
	Yes	No	
1. Checks temperature chart for refrigerator containing vaccines			
2. Stores measles, MMR, BCG and polio vaccines in the freezer until ready for use			
3. Stores ready to use DPT, DPT and Hepatitis B, and BCG vaccines on the upper shelf of the refrigerator.			
4. Stores tetanus and DT on the middle shelf.			
5. Stores vaccine solvents in the refrigerator			
6. Maintains adequate supply of all vaccines			
7. Stores only vaccines with valid expiration dates			
8. Has cold boxes for transporting vaccines			
9. Knows/Follows the procedure for disposing of expired vaccines.			

Infection Prevention Practices

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Glossary

Asepsis (aseptic technique): a general term used to describe efforts made to protect the human body from living organisms likely to cause infection. The purpose of asepsis is to eliminate or reduce to a safe level the number of microorganisms attached to the skin or tissues of the human body or to surgical instruments.

Antisepsis: protecting against infection by destroying or containing the growth of microorganisms attached to the skin or mucous membranes, through the use of chemicals or disinfectants.

Cleaning: the process that physically removes blood and secretions from instruments and other equipment. For effective cleaning, it is important to wash the instruments with water and a liquid detergent like Golden. This process removes up to 80 % of most microorganisms. Hand soap is not as effective as liquid soap in cleaning instruments.

Disinfection: the process of removing most—but not all—disease-causing microorganisms from surgical instruments.

Dormant (inactive) Bacteria: harmless bacteria that dwell in specific areas of the body—such as the eye, mouth, ear, skin, respiratory system, and intestine—however, if these bacteria are transmitted to another location they become harmful. The types of bacteria most frequently encountered are streptococcus, haemophilus, and nisseria, which are found in the mouth.

Decontamination: the treatment of instruments and equipment before cleaning to make them safer for handling by all personnel, particularly cleaning personnel. Items requiring decontamination include the examination bed, surgical instruments, and gloves that have been contaminated with blood or body fluids.

Endospores: bacteria associated with gangrene and tetanus.

High-level Disinfection (HLD): the process of destroying all microorganisms including vegetative bacteria, tuberculosis, fungi and viruses through boiling or the use of chemicals. Some bacterial endospores are not destroyed through HLD.

Microorganism: a living organism capable of causing infection or illness, including bacteria, parasites, fungi, and viruses.

Sterilization: the process of destroying all microorganisms, including endospores.

Infection Prevention Practices

Introduction

Microorganisms are the causative agents of infection, and are found everywhere in our environment. They include bacteria, viruses, fungi and parasites. Humans carry microorganisms on their skin, in the upper respiratory tract, and in the digestive system; under ordinary circumstances, these microorganisms are known as normal body flora. These microorganisms also inhabit animals, plants, soil, air, and water and can contaminate instruments and equipment.

Some microorganisms are considered more harmful than others and, consequently, are more inclined to cause infection and disease. This occurs when certain favorable conditions exist for these bacteria, viruses, and other germs to survive and spread in the surrounding environment.

Important Points

- Microorganisms include bacteria, viruses, fungi, and parasites.
- All microorganisms—except endospores—can be eliminated with high-level disinfection (HLD). The only way to eliminate endospores is by sterilization.
- Infection prevention often relies on placing barriers between the host and microorganisms. Protective barriers can be physical, mechanical, or chemical.
- In order to create an environment free of communicable diseases, all health service providers, including cleaning and maintenance staff, are duty-bound to understand the basic conditions of infection protection.
- Because it is not possible to know in advance if an individual is infected with a communicable disease such as hepatitis, service providers must treat all clients and all instruments as though they are contaminated.

Situations Where Infection May Occur

Infection can spread from person to person, from staff to other persons or vice versa, and from contaminated instruments or equipment. For example:

- When touching any wound or contaminated instruments.
- When cleaning instruments, equipment and contaminated surfaces.
- During a clinical vaginal or dental examination.
- When examining a patient without washing hands before and after.

The Comparative Danger of Exposure to Hepatitis B and HIV

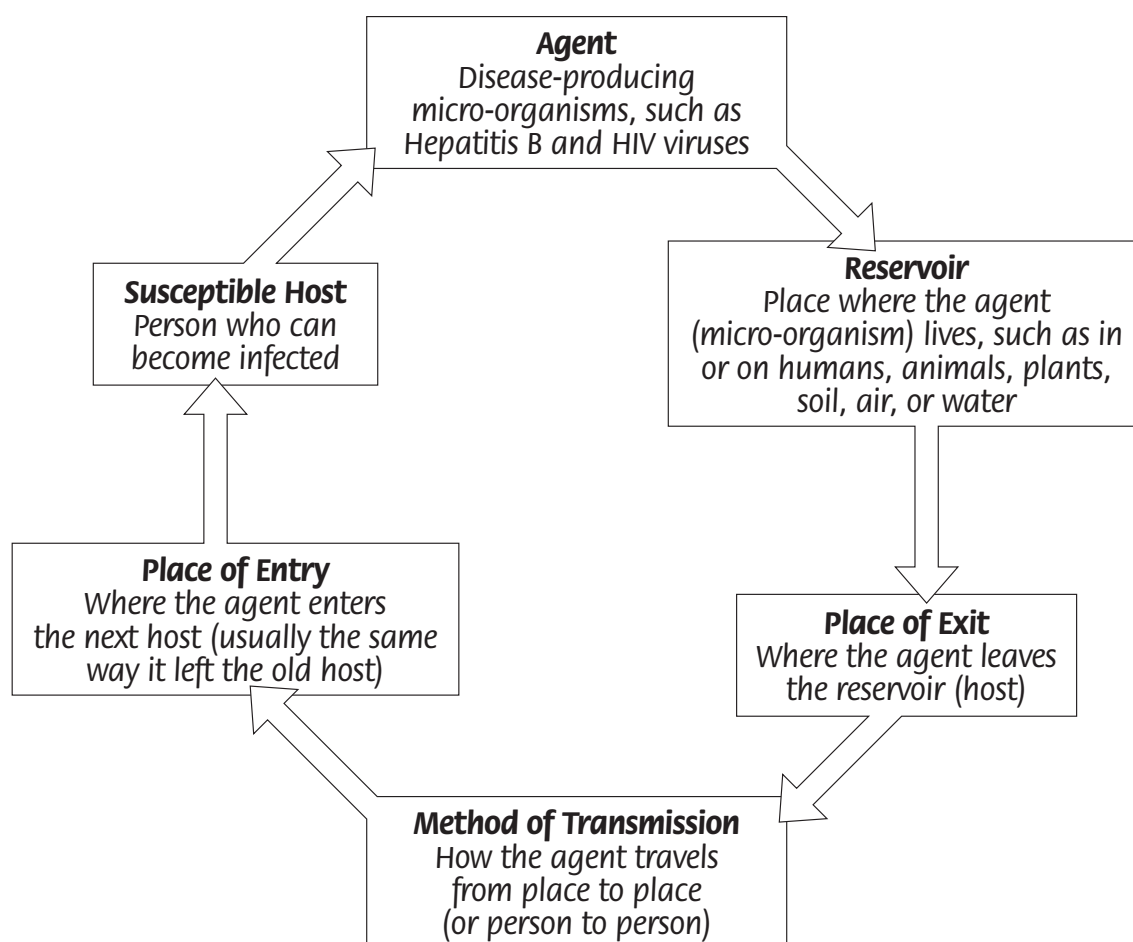
The risk of infection after exposure to hepatitis B from a needlestick injury is 27-37 %. With HIV, the risk is lower, at 0.4 %. While most cases of hepatitis B and HIV transmission to health workers have been associated with preventable accidents like puncture wounds, transmission can also occur through accidental mucous membrane contact, such as a splash of body fluids into the health worker's eye or nose. Broken skin or any unhealed cut or scratch can also be a point of entry for both viruses. For this reason, splashes of blood onto small wounds must be avoided.

The Disease Transmission Cycle

The disease transmission cycle is a six-stage process whereby disease is transmitted from one host to another. The essential factors in the transmission of disease-producing microorganisms from person to person include the interference of the following factors: agent, reservoir, place of exit, method of transmission, place of entry, and susceptible host. Figure 1 illustrates these factors. The six stages of the disease transmission cycle are agent, reservoir, place of exit, method of transmission, place of entry, and susceptible host.

Agent	a disease-producing microorganism (e.g., Hepatitis B)
Reservoir	the place or natural habitat in which microorganisms live; reservoirs include the human body, animals, soil, plants, air, water and food
Place of Exit	where the agent leaves the reservoir (host)
Method of Transmission	how microorganisms are transmitted from the point of exit to the new point of entry: by water, air, insects, inanimate matter, parts of the body like hands, or medical waste that has been disposed of incorrectly
Place of Entry	where the agent enters the next host
Susceptible Host	a person who can become infected

Figure 1. The Disease Transmission Cycle¹



¹ Adapted from: Tietjen, L., Cronin, W. & McIntosh, N. (1992), *Infection Prevention for Family Planning Service Programs*, Essential Medical Information Systems, Durank, Oklahoma, 7.

Methods of Protection against Infection: Protective Barriers

Infection prevention often relies on placing barriers between the host and microorganisms, which are spread when proper infection prevention practices are not in place or when instruments or equipment are contaminated. Protective barriers can be physical, mechanical or chemical processes that help prevent the spread of infectious organisms from client to client; from clinic staff to client; or vice versa.

Table 1. Rationale for Barrier Use

Barrier	Protects Patients from:	Protects Health Workers from:	Precautions
Gloves	contact with microorganisms on providers' hands	contact with patients' blood or other body fluids; mucous membranes, non-intact skin; and instruments, other items, or surfaces contaminated with blood or other body fluids	
Mask	droplets from providers' or others' noses and mouths, containing microorganisms expelled during talking, coughing, and breathing	exposure of mucous membranes to splashes of blood and other body fluids, and from droplets containing microorganisms	Mask should cover nose, mouth, and cheeks, and extend below the chin.
Eye Protectors	no protection documented	exposure of mucous membranes of the eyes to splashes of blood and other body fluids	
Cap	microorganisms in providers' hair or skin, which can fall on sterile areas	No protection documented	

Barrier	Protects Patients from:	Protects Health Workers from:	Precautions
Jacket, gown and plastic apron	Microorganisms on providers' arms, torso, and clothing	skin exposure to splashes of blood and other body fluids	Wear a waterproof apron under jacket or gown during all procedures in which large amounts of blood and other body fluids are likely (e.g., cesarean delivery).
Shoes	exposure to microorganisms brought from other areas of the facility or the outside into the surgical/ procedure area	stepping on contaminated sharps and from falling equipment	Wear sturdy shoes in surgery. Never walk barefoot in the operating room Recommended: clean plastic or leather boots that cover the whole foot Not recommended: sandals and open shoes

Table 2. Selecting Protective Barriers

Type of Exposure	Protective Barrier	Example
Low Risk Contact with intact skin; no exposure to blood	Gloves not essential	<ul style="list-style-type: none"> • Injection • Minor wound dressing
Medium Risk Probable contact with blood, but splashing unlikely	Gloves Gown or apron may be necessary	<ul style="list-style-type: none"> • Pelvic exam • IUD insertion • IUD removal • Intravenous catheter insertion or removal • Handling laboratory specimens • Large, open wound dressing • Drawing blood • Blood spills
High Risk Contact with blood likely; Splashing probable; Uncontrolled bleeding	Gloves Apron Eyewear Mask	<ul style="list-style-type: none"> • Major surgical procedures • Oral surgery • Vaginal delivery

Protective barriers include:

- Handwashing
- Wearing gloves during surgical operations, clinical tests, placing loops, handling used equipment, and waste disposal.
- Using antiseptic solutions to clean wounds or prepare the skin before surgery.
- Decontamination: the first step in processing used surgical instruments, reusable gloves, and other items. The mostly commonly used disinfectant is chlorine 0.5 % solution.
- Cleaning: the second step in processing used surgical instruments, reusable gloves, and other items.
- Sterilizing surgical instruments, reusable gloves, and other items.

Handwashing

- Hand washing, besides being easy, is one of the most important ways to maintain an infection-free environment in every health center.
- Hand washing reduces the number of microorganisms on the skin by:
 - 50 % ~ washing with water only
 - Up to 80 % ~ washing with soap and water
- Hand washing helps prevent the transmission of contaminants from one person to another.

Wash Hands Before

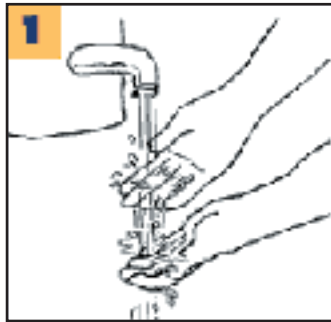
- The start of the workday.
- Putting on gloves.
- Examination of a patient and, in general, any dealings with a sick patient.
- Giving injections.
- Drawing blood.
- Handling sterilized instruments.
- Eating or drinking.
- Writing reports or handling patient files.
- Going home.

Wash Hands After

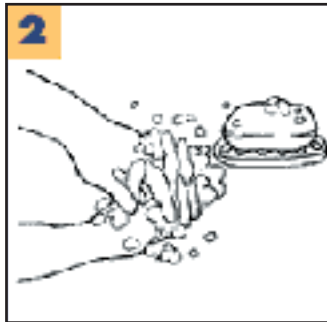
- Examining each patient.
- Touching any part of the body or any mucus membrane excretions.
- Removing gloves.
- Personal use of bathroom.
- Cleaning the nose, coughing or sneezing.
- Touching any instruments that have been used in medical procedures.

Supplies

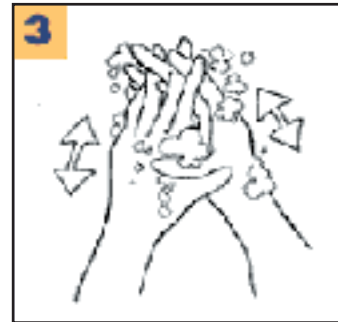
- Clean, running water
- Soap
- A dish with holes for soap (i.e., a dish with good drainage)
- When water and soap are not available, alcohol may be used
- Fine stick or brush for cleaning fingernails if available
- Paper towel or clean dry towel

Figure 2. The Steps of Routine Handwashing²

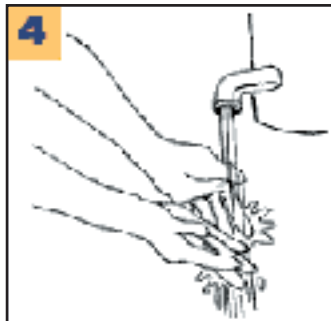
Wet hands with running water.



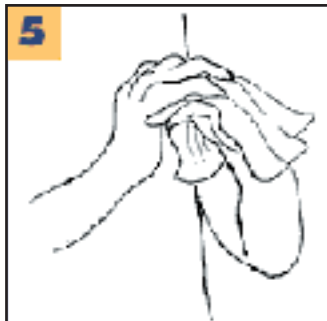
Rub hands together with soap and lather well. Make sure to rub all parts of hands.



Vigorously weave fingers and thumbs together and slide them back and forth for 30-45 seconds.



Rinse hands under a stream of clean, running water until all soap is gone.



Dry hands with a clean towel or allow hands to air-dry.

If water is not available:

- Clean hands with 70 % alcohol.
- Make available a closed bottle containing alcohol ready for use.
- Use moisturizers; alcohol dries and roughens skin. However, do not use moisturizer after every wash, because it can become contaminated with microorganisms.

² Source: EngenderHealth (2002), “Preventing Infection” online course, <http://www.engenderhealth.org/>.

Wearing Gloves

Health providers should wear gloves to protect themselves from contaminated instruments. Gloves also protect clients from infection by providing a barrier between a provider's hands and a client's skin.







Table 3. Which Gloves Should You Wear?

Type of Glove	Advantages	Disadvantages
Sterile Surgical Gloves (Latex) Use for all procedures involving contact with tissue beneath the skin (e.g., Norplant insertion).	<ul style="list-style-type: none"> Gloves are sized to fit, giving dexterity 	<ul style="list-style-type: none"> Expensive Do not use for tasks when other types of gloves can be worn
Examination Gloves Use new exam gloves for contact with mucous membranes and broken skin (e.g., IUD insertion/removal), touching wounds or open sores.	<ul style="list-style-type: none"> Inexpensive: exam gloves are $\frac{1}{4}$ - $\frac{1}{3}$ the cost of disposable surgical gloves 	<ul style="list-style-type: none"> Usually only come in small, medium and large sizes Not available in every country
Utility or Heavy-duty Household Gloves: Use when handling or cleaning used equipment that may be contaminated with blood or body fluids and for handling waste and linens.	<ul style="list-style-type: none"> Inexpensive Can be washed and reused many times Thick rubber surface helps protect cleaners and waste handlers from needlestick injury 	<ul style="list-style-type: none"> When not available, washed latex gloves can be used since there is no patient contact. However, they may not protect workers from injury

Important Points

- Use gloves *only once* in order to avoid infection transmission when examining a patient.
- Do not use any medical gloves whose validity has expired.
- Do not use any gloves that are worn out, cracked, peeling, or with holes or tears.
- Do not touch the exterior of the gloves when putting them on.
- Change gloves if they had been contaminated.
- Wash hands before putting on gloves and after taking them off.

Figure 3. Procedures for Putting on Sterile Surgical Gloves³

<p>Step 1</p> <p>Wash and dry hands thoroughly using the guidelines above.</p>	
<p>Step 2</p> <ul style="list-style-type: none"> Place the sterilized container holding the gloves on a clean surface. Do not touch the inside of the container. Open gloves in a clean and dry area. Select the correct size gloves. If gloves are not powdered, spray powder on hands. 	
<p>Step 3</p> <p>Hold the folded cuff of the glove with your thumb and forefinger (index finger) without touching the outside of the glove.</p>	
<p>Step 4</p> <ul style="list-style-type: none"> Insert the fingers of your other hand in a downward direction, keeping your thumb towards the palm. The fingers must be separated from each other. Pull the glove back towards your wrist. If after putting on the first glove it is not comfortable, wait until you have put on the other glove before adjusting it. This is to ensure that it remains sterile. 	
<p>Step 5</p> <p>Hold the second glove with the first, gloved, hand and insert your fingers into the glove.</p> <p>Note: It is important to avoid contaminating the sterilized glove with the ungloved hand.</p>	
<p>Step 6</p> <ul style="list-style-type: none"> To fold back the cuffs, put your fingers between the cuff and the glove, touching only the outside of the gloves. Do not touch anything that is not sterile once you are wearing the gloves—holding your hands in front of your eyes is a good technique. If you feel that the gloves have been contaminated, remove them and put on another sterilized pair. Remove gloves from the inside to the outside, making sure not to let them touch the palm or fingers because the gloves could be contaminated. 	

³ Source: EngenderHealth (2002), "Preventing Infection" online course, <http://www.engenderhealth.org/>.

Care of Used Surgical and Exam Gloves

- Before removing used gloves, immerse gloved hands in a 0.5 % chlorine solution or in another approved disinfectant that is available locally.
- After removing gloves, wash them thoroughly and soak them in a chlorine solution for 10 minutes to decontaminate them before disposing of them.

Antiseptics

Antiseptics are chemical agents used on the skin and other body tissues to destroy or suspend the multiplication of most microorganisms that can damage tissues. Cleaning the skin with antiseptic solutions is very important in preventing infection.

Antiseptics are designed to remove as many microorganisms as possible without damaging or irritating the skin or mucous membrane. Use antiseptic solutions in situations like the following:

- On the client's skin before giving any injection, to remove as many microorganisms as possible from the client's skin and thus prevent infection of the skin.
- Before taking blood samples.
- Vaginal preparation for procedures, such as IUD insertion.
- Hand-washing prior to examining clients who are susceptible to infection such as newborns or clients with weak immune systems.

Precautions that must be followed while using antiseptics are as follows:

- Antiseptics are used only to sterilize the skin or mucous membranes.
- They should never be used to sterilize non-living objects like the operating table, instruments, or reusable gloves.
- Do not use alcohol to disinfect mucus membranes—it causes burning.

Commonly Available Antiseptics

Many chemicals are skin-safe antiseptics. These are commonly available in Jordan:

- Alcohol Solutions
- Chlorhexidine Gluconate
- Hexachlorophene
- Iodine/Iodophor Solutions
- Parachlorometaxylenol (e.g. Dettol)
- Cetrimide/Chlorhexidine Gluconate (e.g. Savlon)

Table 4. Commonly Available Antiseptics*

Name & Description	Advantages	Disadvantages
Alcohol Solutions 60-90% ethyl, isopropyl or "methalated spirit"	<ul style="list-style-type: none"> • Among safest known antiseptics • Commonly available • Relatively inexpensive • Very effective at reducing # of microorganisms on the skin • Effective against hepatitis & HIV • Rapidly kill all fungi & bacteria including mycobacteria • No long-term killing effect, but rapidly reduce microorganisms on skin and protect against regrowth for several hours 	<ul style="list-style-type: none"> • Evaporate rapidly, causing drying of skin. • Must not be used on mucous membranes. • Easily inactivated by organic materials. • Flammable; should be stored in a cool, well-ventilated area.
Chlorhexidine gluconate (CHG) 4% (Hibiclens®, Hibiscrub®, Hibitane®) Excellent antimicrobial; safe even for newborns. Recommended concentration: 4%.	<ul style="list-style-type: none"> • Remains active for many hours after use • Number of microorganisms inhibited increases with repeated use • Minimally affected by organic material • Commonly available 	<ul style="list-style-type: none"> • Expensive; not always available. • Action reduced by natural soaps and by substances in hard tap water. • Must be used repeatedly for maximum effectiveness and residual activity.
Hexachlorophene 3% (Phisoxhex®) Active against gram-positive cocci such as staphylococcus, but has little or no activity against gram-negative bacteria, viruses, Mycobacterium tuberculosis, or fungi.	<ul style="list-style-type: none"> • Excellent residual activity when used repeatedly 	<ul style="list-style-type: none"> • Inactivated by iodine and alcohol • May lead to serious neurotoxic side effects • Rebound bacteria growth with discontinued or intermittent use
Iodine 1-3% tincture & aqueous Iodophor solutions, various concentrations (e.g. Betadine®) Iodophors are solutions of iodine mixed with a carrier that releases small amounts of iodine. Povidone iodine is the most common iodophor. Iodophors require up to 2 minutes' contact time to release free iodine; once released, the iodine has rapid killing action.	<ul style="list-style-type: none"> • Inexpensive, effective and commonly available • Iodophors kill vegetative bacteria, mycobacterium viruses and fungi • Iodophors are non-irritating (unless person is allergic to iodine) on skin or mucous membranes, making them ideal for vaginal preparation before IUD insertion <p>Notes: Iodine must never be used in an undiluted form on mucous membranes. Use iodophors as indicated above.</p>	<ul style="list-style-type: none"> • Iodophors have little residual effect • Iodine and iodophors are inactivated by organic materials • Iodine in a diluted form may cause skin irritation to allergic persons and must be removed from skin after drying. Use alcohol to remove iodine • Iodine skin absorption may cause hypothyroidism in newborn infants

*Other commonly available antiseptics are *Parachlorometaxylenol e.g. Dettol® Cetrimide and chlorhexidine gluconate e.g.

Savlon®

Practical Guidelines for the Use of Antiseptics

Preparing Skin and Mucous Membranes for Surgical Procedures and IUD Insertion

- Do not remove hair from the operation site unless necessary. If it is absolutely necessary, trim hair close to the skin surface immediately before surgery. Shaving increases the risk of infection because it causes small nicks in the skin that are ideal for the growth of microorganisms.
- Before choosing an antiseptic solution, ask the client about allergic reactions.
- Do not use alcohol on mucous membranes.
- If the area around the patient's reproductive organs is visibly unclean, wash with soap and water before wiping with antiseptic.
- Select and apply an appropriate antiseptic using dry, disinfected forceps and cotton soaked in the antiseptic. Thoroughly cleanse the skin working from the operation site outwards using a circular motion.
- Do not let antiseptic collect under the client's body, to avoid causing skin irritation.
- Let the antiseptic dry before starting the procedure.
- Dispose of cotton and muslin according to recommended practices.

Preparing the Skin for Injections

- Clean the skin with 60-90 % alcohol solution.
- Wipe the injection site thoroughly with a fresh cotton swab and alcohol solution using a circular, overlapping motion, starting at the center.
- Make sure the area is dry before giving the injection.

Handwashing with Antimicrobial Soaps

- The process is the same as that for routine hand washing. For most activities, vigorous rubbing of hands with antimicrobial soap for 15-30 seconds, followed by rinsing in a stream of water, is sufficient.
- Used in clients susceptible to infection such as newborns or immunosuppressed persons.
- Used in surgical scrub and skin or vaginal preparation for procedures such as IUD insertion.

Steps in Infection Prevention

To prevent disease transmission from contaminated instruments, gloves and other items, follow these basic processes:

Step 1: Decontamination and Waste Disposal

And

Step 2: Cleaning and Rinsing

And

Step 3: Sterilization

Or

Step 4: High-Level Disinfection

Step 1: Decontamination and Waste Disposal

Decontamination is the first step in handling instruments and gloves that have been in contact with body fluids. It is important because it makes them safer for handling by cleaning staff. Soaking items in a 0.5 % chlorine solution for 10 minutes deactivates hepatitis B and HIV.

Decontamination Supplies

- Water
- Plastic cup
- Thick gloves
- Chlorine solution 0.5 %

Decontamination Procedures

1. Make sure that there is good ventilation in the room.
2. Wear gloves for protection.
3. Immediately after use, place instruments in a 0.5 % chlorine solution for 10 minutes.
4. Surfaces that may have been contaminated—such as examination tables—should also be decontaminated before reuse. Wiping with a suitable disinfectant, such as 0.5 % chlorine solution.
5. After decontamination, rinse instruments immediately with cool water to prevent corrosion.
6. Dispose of contaminated objects like cotton and gauze in a leak-proof container, making sure they do not touch the outside of the container.

Step 2: Cleaning and Rinsing

A thorough cleaning with detergent and water physically removes organic material such as blood and secretions. Cleaning is a very important step in maintaining infection-free equipment and instruments because without it, neither sterilization nor high-level disinfection is effective.

Cleaning Supplies

- Detergent (preferably liquid detergent)
- Brushes of various sizes; old toothbrushes work well
- Thick protective gloves
- A sink for washing and rinsing

Cleaning Procedures

1. Wear protective gloves.
2. Immerse instruments in detergent and water and scrub with a soft brush, such as an old toothbrush. Do not use abrasive cleaners. It is important to hold instruments underwater while cleaning to avoid splashing infectious material.
3. Use a soft brush to clean the teeth, joints and screws of instruments.
4. Rinse instruments in clean water until no detergent remains.
5. Air-dry or use a clean towel.
6. Proceed with sterilization (if available) or high-level disinfection.

Step 3: Sterilization

Sterilization destroys all microorganisms, including bacterial endospores. Therefore, wherever possible, instruments that have been in contact with blood or tissues under the skin should be sterilized after first being decontaminated, thoroughly cleaned, rinsed, and dried.

The two main methods of sterilization are heat sterilization by autoclaving or dry heat (electric oven); and chemical sterilization.

Sterilization

- Steam Sterilization by Autoclaving

Steam is an effective sterilizer if these four conditions are met:

- *Adequate contact between steam and microorganisms. This requires proper cleaning, and sterilization packs that are neither wrapped nor packed in too tightly.*
- *The temperature is maintained at 121°C.*
- *Sufficient time is given.*
- *Sufficient moisture ("saturated" steam with 100% relative humidity).*

Supplies

- Autoclave: must be expertly maintained
- Cotton muslin
- Fabric or paper for padding
- Plastic bags for storage

Procedures for Sterilization by Autoclave

1. Decontaminate, clean, and dry all instruments to be sterilized.
2. Carefully follow the manufacturer's operating instructions.
3. All jointed instruments should be in the open or unlocked position. Disassemble instruments with more than one part.
4. Wrap needles and sharp edges in muslin to prevent dulling of edges.
5. To allow free circulation of steam, make sure instruments are not bound tightly together and that packs are arranged to facilitate steam penetration to all surfaces.
6. Wrap instruments in two layers of cotton muslin.
7. Heat water until steam escapes from the pressure valve only, then reduce heat, but make sure steam continues to escape from the pressure valve. Do not allow to boil dry.
8. Sterilize wrapped items for 30 minutes, unwrapped items for 20 minutes at a temperature of 121 °C. Pressure should be 106 kPa (15 lbs/in²).
9. Wait 20-30 minutes (or until the pressure gauge reads zero) to allow the sterilizer to cool sufficiently. Then, open the lid to allow steam to escape.
10. Make sure instruments have dried completely before removing them. This may take up to 30 minutes.
11. Place sterile trays and packs on a surface padded with paper or fabric to prevent condensation.
12. Do not store trays or packs until they cool to room temperature; this usually takes about one hour.
13. Instruments wrapped in cloth or paper can be stored for one week, but only if kept dry.
14. Instruments sealed in a plastic bag can be stored up to one month.
15. Unwrapped instruments should be used the same day.
16. All packs should be labeled with an expiration date.

Note:

We can heat cotton muslin up to a temperature of 204°C. Gloves made of plastic or latex should not be placed inside a dry hot oven at all because they will perish.

- Sterilization by Dry Heat

Dry heat is a practical way to sterilize instruments. A commercial sterilizer with a fan is recommended, but dry heat can be done with a simple oven. Note, however, that it cannot be used for plastic or rubber items because of the high temperatures required.

- Dry heat dulls sharp points and edges less than autoclaving and chemical sterilization; therefore it is ideal for sterilizing reusable needles and syringes.
- Dry heat reaches all surfaces of instruments; therefore it is good for instruments that cannot be disassembled.
- Dry heat leaves no chemical residue.

Procedures for Sterilization by Dry Heat

1. Decontaminate, clean, and dry all instruments to be sterilized.
2. Wrap instruments in cotton muslin (if temperature to be used will exceed 204°C) or aluminum foil, or place in a metal, lidded container.
3. Place instruments in metal containers or on trays in oven and heat to desired temperature.
4. Begin timing after the desired temperature is reached. The following temperature : time ratios are recommended:

Temperature	Time
170°C	1 hour
160°C	2 hours
150°C	2.5 hours
140°C	3 hours
121 °C	Overnight

Note: Depending on the temperature selected, the total cycle time (pre-heating, sterilization time, and cool-down) ranges from about 2½ hours at 170°C, to 4½ hours at 140°C.

5. After cooling, remove loose items with sterile forceps and store in sterile covered containers.

Chemical Sterilization

Chemical sterilization is an alternative to steam or dry heat sterilization. Chemical sterilization is necessary for instruments like laparoscopes, which can be damaged by heat sterilization. Note that these chemicals cause skin irritation and must be handled carefully. As chemical used in sterilization leave a residue, it is essential rinse treated instruments with sterile water afterwards.

Supplies

- Glutaraldehyde 2 % (Cidex®) or formaldehyde 8 %
- Protective gloves
- Protective eyeglasses
- A deep basin with lid
- Sterile water in a sterile container for rinsing
- Sterile paper or cloth for wrapping

Chemical Sterilization Procedures

1. Decontaminate, clean, and dry instruments to be sterilized.
2. Wear gloves and protective eyeglasses.
3. Prepare and use the solution in a ventilated area.
4. Follow the manufacturer's instructions when preparing the solution and use a deep basin to fully immerse the instruments.
5. Allow to soak at least 8-10 hours in glutaraldehyde (check product instructions) or for 24 hours in 8 % formaldehyde solution.
6. Remove instruments with large sterile forceps.
7. Rinse in sterile water to remove toxic chemical residue; boiled water is acceptable but does not reliably destroy endospores.
8. Air-dry.
9. Wrap in sterile paper or cloth without touching either the sterilized instruments or the inside of the sterile wrap, or place in a covered sterile container.
10. If not used immediately, store up to one week in a sterile container with a lid.
11. If the glutaraldehyde solution is to be used again for sterilization, indicate the date of preparation and the expiration date on the container.

Disposing of Used Chemical Containers

Plastic containers used for toxic substances, such as glutaraldehyde (Cidex®), must be rinsed three times in water and then buried.

Step 4: High-Level Disinfection

When sterilization is not possible or suitable, high-level disinfection (HLD) is the only acceptable alternative. HLD destroys most microorganisms, including hepatitis B and HIV, but not some bacterial endospores. There are two methods of HLD: boiling and chemical HLD

HLD by Boiling

Boiling in water is an effective way of disinfecting instruments and gloves when sterilization is not available; however, boiling does not kill all endospores and thus will not achieve sterilization.

HLD by Chemicals

There are a variety of chemical disinfectants available.

Note: Although alcohols and iodophors are inexpensive and readily available, they are not classified as HLDs. They should be used for disinfection only when HLDs are not available.

Chemical disinfection of needles and syringes should be avoided altogether because chemical residues, unless completely removed by rinsing, may interfere with the action of medications being injected.

Supplies

- Chemical disinfectant
- Boiled water

Procedures for HLD by Chemicals

1. Decontaminate, thoroughly clean, and dry instruments to be disinfected.
2. Fully immerse instruments in the correct dilution of disinfectant that has been correctly stored in a cool, dark area.
3. Soak instruments for 20 minutes.
4. Remove instruments from disinfectant using large forceps.
5. Rinse well with boiled water then air-dry.
6. Use instruments promptly. They may be stored for up to one week in a high-level disinfected covered container.
 - To prepare an HLD container, fill it with a 0.5% chlorine solution and soak 20 minutes. Rinse the inside thoroughly with boiled water and air-dry before use.

Recommended Dilutions for Chlorine⁴

Any concentration of chlorine may be used to make a 0.5 % chlorine solution by using the following formula:

$[\% \text{ chlorine divided by } 0.5\%] \text{ minus } 1 = \text{parts water for each part chlorine solution}$

For example, to make a 0.5 % chlorine solution from a 3.5 % chlorine concentrate, you must use 1 part chlorine and 6 parts water:



$[3.5\% \text{ divided by } 0.5\%] \text{ minus } 1 = [7] \text{ minus } 1 = 6 \text{ parts water for each part chlorine}$

Note:

Chlorine solution can be transferred to a plastic container and reused.

Disposal of Used Chemical Containers

Plastic containers used for toxic substances such as glutaraldehyde (Cidex) must be rinsed three times in water and then buried.

Products Incorrectly Used as Disinfectants

Many antiseptic solutions are used incorrectly as disinfectants. While antiseptics (sometimes called skin disinfectants) are adequate for cleaning skin before an injection or surgical procedure, they are not appropriate for disinfecting instruments. They do not destroy all bacteria and viruses unless they contain 70 % alcohol, and even then they still do not destroy bacterial endospores.

Antiseptics that should *not* be used as disinfectants:

- Savlon®: cetrimide with chlorhexidine gluconate
- Cetavlon®: cetrimide
- PhisoHex®: hexachlorophene
- Hibiscrub®, Hibitane®: Chlorhexidine gluconate
- Mercury compounds: toxic, not recommended as antiseptics or disinfectants
- Acridine derivatives

⁴ Source: EngenderHealth website: <http://www.engenderhealth.org/ip/instrum/inm7.html>

Waste Disposal⁵

Wastes from health care facilities may be non-contaminated or contaminated.

Non-contaminated wastes pose no infectious risk to those who handle them. Examples of non-contaminated waste are paper, trash, boxes, bottles, and plastic containers.

Contaminated wastes may carry high loads of microorganisms that are potentially infectious to any persons who contact or handle the waste and to the community at large, if not disposed of properly. Contaminated wastes include blood, pus, urine, stool, and other body fluids, and items that contact them, such as used dressings.

Procedures for Handling Waste Containers⁶

- Use non-corrosive washable containers (plastic or galvanized metal) with covers for contaminated wastes.
- Place waste containers at convenient places for users. Carrying waste from place to place to place increases the risk of infection for handlers.
- Equipment used to hold and transport wastes must not be used for any other purpose in the clinic or health care facility. Contaminated waste containers should be marked as such.
- Wash all waste containers with a disinfectant cleaning solution (0.5% chlorine solution) and rinse with water. Clean contaminated waste containers each time they are emptied and non-contaminated ones when visibly soiled.
- When possible, use separate containers for combustible and non-combustible wastes. This prevents workers from having to handle and separate wastes by hand later.
 - *Combustible (burnable) wastes include paper, cardboard, and contaminated wastes such as used dressings and gauze.*
 - *Non-Combustible (non-burnable) wastes include glass, metals and plastics.*
- If available, use heavy work gloves when handling wastes.
- Wash hands after handling waste.

⁵ Tietjen, L., Cronin, W. & McIntosh, N. (1992), *Infection Prevention for Family Planning Service Programs*, Essential Medical Information Systems, Durant, Oklahoma.

⁶ Source: *Infection Prevention: A reference booklet for health care providers*, EngenderHealth, New York, 2000.

Disposing of Sharp Objects

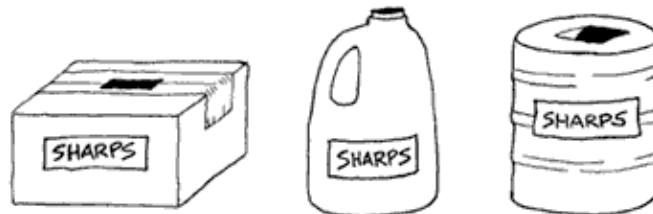
(Needles, razors, and scalpel blades)

- Wear thick, household gloves.

Note:

To avoid accidental needle sticks, do not bend or break needles prior to disposal. Needles should not be recapped routinely.

- Dispose of all sharp items in a puncture-resistant container. Puncture-resistant containers can be made of easily available objects such as a heavy cardboard box, a plastic jug, or a metal container.⁷



Note:

Place the container close to the area where it will be used so that workers do not have to carry sharp items any distance before disposal.

- When the “sharps” container is $\frac{3}{4}$ full; cap, plug or tape it tightly closed.
- Dispose of container when $\frac{3}{4}$ full by burying. (Needles and other sharp objects may not be destroyed by burning, and may later cause injuries that can lead to a serious infection. Incineration or burning in a container, however, does make those items unavailable to scavengers.)
- Wash hands after handling sharps containers, and decontaminate and wash gloves.

⁷ Image Source: EngenderHealth website: <http://www.engenderhealth.org/>

Disposing of Liquid Contaminated Wastes

(Blood, feces, urine, and other body fluids)

- Wear thick household (utility) gloves when handling and transporting wastes.
- Carefully pour wastes down a utility sink drain or into a flushable toilet. Liquid wastes can also be poured into the latrine. Avoid splashing.
- Rinse the toilet or sink carefully and thoroughly with water to remove residual wastes. Avoid splashing.
- Decontaminate specimen container with 0.5 % chlorine solution, or other locally available and approved disinfectant, by soaking for 10 minutes before washing.
- Wash hands after handling liquid wastes, and decontaminate and wash gloves.

Disposing of Solid Wastes

Used dressings and other items contaminated with blood and organic materials

- Wear thick household (utility) gloves when handling and transporting wastes.
- Dispose of solid wastes in non-corrosive washable containers (plastic or galvanized metal) with tight fitting covers.
- Collect the waste containers on a regular basis and transport the combustible ones to the incinerator. (If incineration is not available, burn or bury.) Bury non-combustible waste.
- Wash hands after handling wastes, and decontaminate and wash gloves.

Note:

Burn or bury waste immediately before it can spread into the environment.

How to Build a Simple Drum Incinerator for Waste Disposal

- Select a site downwind from the health center.
- Build a simple incinerator using local materials (mud or stone) or a used oil drum. The size depends on the amount of daily waste collected.
- Place the burner on hardened earth or a concrete base.
- Make sure the incinerator has sufficient air inlets underneath for good combustion and an adequate opening for adding fresh refuse, and for removal of ashes.
- Burn all combustible wastes, such as paper and cardboard, as well as used dressings and other contaminated wastes.
- If the waste or refuse is wet, add kerosene so that a hot fire burns all the waste.
- Ash from incinerated material can be treated as non-contaminated waste.

How to Make and Use a Waste Burial Site

- Bury in a specified location.
 - *Select a site at least 50 meters away from any water source, to prevent contamination of the water source.*
 - *The site should be downhill from any wells.*
 - *Make certain the burial site will not flood.*
- Dig a pit 1 meter wide and 2-5 meters deep. The bottom of the pit should be 1.8 meters above the water table.
- Fence the site to keep animals away.
- Keep waste covered. Every time waste is added to the pit, cover it with a 10-30 cm layer of soil.
- When the level of waste reaches within 30-50 cm of the surface of the ground, fill the pit with dirt, seal it with concrete, and dig a new waste pit.

Performance Checklist 4: Decontamination, Cleaning, and Sterilization or High-Level Disinfection (HLD)

Performance Checklist 4: Decontamination, Cleaning, and Sterilization or High-Level Disinfection (HLD)

Instructions: Observe the provider's practice. For each of the tasks listed below, place a check in the "Yes" or "No" box, as appropriate, to indicate whether or not the task was achieved. If a particular task is not applicable, enter NA ("not applicable") in the "Comments" column. Use the "Comments" column to note details about why a particular task was not achieved or other information that may be useful in identifying or resolving inappropriate practices.

Task	Achieved?		Comments
	Yes	No	
Decontamination			
1. Decontaminates instruments in 0.5% chlorine solution immediately after use.			
2. Removes surgical gloves immediately after use.			
3. Correctly disposes of contaminated objects, such as cotton or gauze, and puts them in leak-proof containers.			
4. Wipes contaminated surfaces, such as examination tables, with cloth with 0.5% chlorine solution.			
Cleaning of Instruments			
1. Puts instruments in detergent and water.			
2. Cleans instruments with a brush under running water to remove all organic material.			
3. Cleans teeth, joints and screws of instruments.			
4. Rinses all parts of instruments with clean water.			
5. Dries instruments by air or with clean towel or paper towel.			
Preparing Instruments for Sterilization			
1. Places instruments on a clean, sterilized tray.			
2. Wraps instruments.			

Task	Achieved?		Comments
	Yes	No	
3. Puts instruments in a metal container.			
4. Correctly arranges instruments in the sterilizer.			
Sterilization by Autoclave			
1. Arranges instruments correctly to facilitate steam penetration to all surfaces.			
2. Sterilizes wrapped items for 30 minutes (unwrapped items for 20 minutes) at a temperature of 121 °C.			
3. Before opening the autoclave, waits 20-30 minutes for sterilizer to cool down until pressure gauge reads zero.			
4. Waits for about 30 minutes for instruments to cool down completely before removal from the sterilizer.			
5. Registers temperature, time of sterilization and pressure in the autoclave record book.			
6. Labels all packs with expiry date.			
Sterilization by Dry Heat			
1. Puts instruments in a metal covered container or on tray.			
2. Starts timing after desired temperature is reached.			
3. After sterilizer cools, removes unwrapped instruments with sterile forceps and stores in covered sterile container.			
HLD by Chemicals			
1. Prepares a new chemical solution and ensures its validity.			
2. Submerges instruments in a 20 % glutaraldehyde solution or 8 % formaldehyde solution.			

Task	Achieved?		Comments
	Yes	No	
3. Soaks instruments for at least 8-10 hours in a glutaraldehyde solution or for 24 hours in a formaldehyde solution.			
4. Removes instruments with large sterile forceps.			
5. Rinses in sterile water to remove toxic chemical residue.			
6. Uses instruments immediately or stores in a sterile, covered container.			

References

(2000), *Infection Prevention: A reference booklet for health care providers*, EngenderHealth, New York.

Al-Mazrou, Y.Y. (1994), *Quality Assurance in Primary Health Care Manual*, WHO Eastern Mediterranean Regional Office and Saudi Arabia MOH General Directorate of Health Centres.

EngenderHealth (2002) website, <http://www.engenderhealth.org/>.

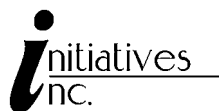
Tietjen, L., Cronin, W. & McIntosh, N. (1992), *Infection Prevention for Family Planning Service Programs, Essential Medical Information Systems*, Durant, Oklahoma.



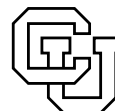
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